

FORM PTO-1390  
(REV. 10-94)U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICEATTORNEY'S DOCKET NUMBER  
1384.1006/JDH**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C 371**U.S. APPLICATION NO. (If known, see  
37 C.F.R. 1.51)  
097194042

INTERNATIONAL APPLICATION NO. PCT/DE97/01346	INTERNATIONAL FILING DATE June 27, 1997	PRIORITY DATE CLAIMED June 27, 1996
TITLE OF INVENTION DEVICE FOR THE RECEPTION OF VISUAL SIGNALS USING LIGHT-CONDUCTING OBJECTS		
APPLICANT(S) FOR DO/EO/US (1) Hans POISEL		
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input checked="" type="checkbox"/> This express request to immediately begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay the examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).</li> <li><input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li><input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))             <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input type="checkbox"/> has been transmitted by the International Bureau.</li> <li><input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li><input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li><input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))             <ol style="list-style-type: none"> <li><input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input type="checkbox"/> have been transmitted by the International Bureau.</li> <li><input type="checkbox"/> have not been made; however, the time limited for making such amendments has NOT expired.</li> <li><input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li><input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li><input type="checkbox"/> An oath or declaration of the inventor (35 U.S.C. 371(c)(4)).</li> <li><input type="checkbox"/> A translation of the Annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol> <p>Items 11. to 16. below concern other document(s) or information included:</p> <ol style="list-style-type: none"> <li><input type="checkbox"/> An Information Disclosure Statement Under 37 CFR 1.97 and 1.98.</li> <li><input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li><input type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</li> <li><input type="checkbox"/> A substitute specification.</li> <li><input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li><input type="checkbox"/> Other items or information:</li> </ol>		

U.S. Application No. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO. PCT/DE97/01346	ATTORNEY'S DOCKET NUMBER 1384.1006/JDH
17. [X] The following fees are submitted:		CALCULATIONS      PTO USE ONLY
<p style="text-align: center;"><b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b></p> <p>Search Report has been prepared by the EPO or JPO ..... <b>\$840.00</b></p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... <b>\$720.00</b></p> <p>No International preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) . . . <b>\$790.00</b></p> <p>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . <b>\$1,070.00</b></p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) . . . <b>\$98.00</b></p> <p style="text-align: center;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></p>		<div style="border: 1px solid black; padding: 2px; display: inline-block;">\$      840.00</div>
<p>Surcharge of \$130.00 for furnishing the oath or declaration later than [ 120 ] [ 130 months from the earliest claimed priority date (37 CFR 1.492(e)).</p>		<div style="border: 1px solid black; padding: 2px; display: inline-block;">\$</div>
Claims	Number Filed	Number Extra
Total Claims	8 - 20 =	0
Independent Claims	1 - 3 =	0
Multiple dependent claim(s) (if applicable)		+ \$260.00
<b>TOTAL OF ABOVE CALCULATIONS =</b>		\$      840.00
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28)		\$
<b>SUBTOTAL =</b>		\$      840.00
Processing fee of \$130.00 for furnishing the English translation later than [ 120 ] [ 130 months from the earliest claimed priority date (37 CFR 1.492(f)).		+ \$
<b>TOTAL NATIONAL FEE =</b>		\$      840.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+ \$      0.00
<b>TOTAL FEES ENCLOSED =</b>		\$      840.00
		Amount to be: refunded \$
		charged \$
<p>a. [X] A check in the amount of \$840.00 to cover the above fees is enclosed.</p> <p>b. [ ] <del>Repayment of Deposit is enclosed.</del> 19-3935 in the amount of \$_____ to cover the above fees. A</p> <p>c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-3935. A duplicate copy of this sheet is enclosed.</p> <p><b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b></p>		
<p>SEND ALL CORRESPONDENCE TO:</p> <div style="display: flex; justify-content: space-between;"> <div> <p>STAAS &amp; HALSEY 700 Eleventh Street, N.W. Suite 500 Washington, D.C. 20001 Telephone: (202) 434-1500 Facsimile: (202) 434-1501</p> </div> <div style="text-align: center;"> <p>November 23, 1998 DATE</p> </div> <div style="text-align: center;"> <p>SIGNATURE</p> <p><u>James D. Halsey, Jr.</u> NAME</p> <p><u>22,729</u> REGISTRATION NUMBER</p> </div> </div>		

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Hans POISEL

Serial No.: 09/194,049

Filed: November 23, 1998

For: DEVICE FOR RECEIVING OPTICAL SIGNALS BY MEANS OF A  
LIGHT-GUIDING OBJECT**PRELIMINARY AMENDMENT**Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Before examination of the above-identified application, please amend the  
application as follows:

**IN THE SPECIFICATION:**

Please AMEND the specification as follows:

Page 6, line 20, change "Brief Description of an embodiment" to

--DESCRIPTION OF THE PREFERRED EMBODIMENT--.

**IN THE CLAIMS:**

Please AMEND the following claims:

**Claim 3,** line 1, replace "Claim 1 or 2" with --claim 1--.**Claim 4,** line 1, replace "any of the Claims 2 to 3" with --Claim 2--.**Claim 5,** line 1, replace "the Claims 1 to 4" with --Claim 1--.

**Claim 7,** line 1, replace "the Claims 1 to 4" with --Claim 1--.

**Claim 8,** line 1, replace "the Claims 1 to 4" with --Claim 1--.

**REMARKS**

This Preliminary Amendment is submitted to improve the form of the claims as originally-filed.

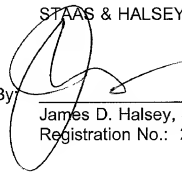
It is respectfully requested that this Preliminary Amendment be entered in the above-referenced application.

If any further fees are required in connection with the filing of this Preliminary Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY

By

  
\_\_\_\_\_  
James D. Halsey, Jr.  
Registration No.: 22,729

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Date: April 12, 1999

101 Rec'd PCT/PTO 12 APR 1999

09/194049

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Device for Receiving Optical Signals by means of a Light-Guiding Object

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### Description

#### **Field of the invention**

The invention relates to a device for receiving optical signals, comprising a light-guiding object into which the optical signal to be received may be coupled. The light-guiding object includes a material having an electron array which may be inverted by energetic excitation and which, under stimulated emission, emits light at an emission wavelength which corresponds to the wavelength of the optical signals to be received. For the inversion of the electron state an excitation unit is provided. Moreover, a detector means is coupled to the light-guiding object for optically detecting the light which can be produced by way of the emission processes stimulated by the optical signals which are coupled into the light-guiding object.

#### **Prior art**

Devices for receiving optical signals are known from a great number of engineering and scientific applications. All the known optical detector means are based on the problem of converting an electromagnetic radiation into an information unit which is directly related to the optical output signal and which can be processed in engineering terms, i.e. using the means of today's evaluation electronics. An essential aspect of the implementation of high-quality optical detectors is the conversion of electromagnetic radiation into electrical signals as direct as possible, which signals may then be supplied to a further electronic evaluation system. These requirements are satisfied by photo-sensitive semiconductor detectors in particular, where the photons to be detected release electrical charges directly in the semiconductor element, which charges may then be analysed correspondingly.

Even though the known optical detector means, which are designed on the basis of semiconductor materials, normally present only very small limited photo-sensitive detector surfaces it is yet possible to design also large-area detector surfaces by a mosaic-type composition of a plurality of individual detectors. It is moreover fundamentally possible to assemble any detector surface geometry on the basis of optical semiconductor detectors; however, firstly a very great expenditure in terms of circuitry is required to interconnect all the individual detectors with an evaluator unit, and secondly large-area detector surfaces incur very high expenses; thirdly, the response rate decreases as the area is increased.

When, however, it is intended to detect an electromagnetic radiation over an area as large as possible light-absorbing detector surfaces with an appropriately large-size configuration are suitable which are made of a predominantly transparent material into which fluorescent dye molecules are linked. When light now hits on such a detector surface the fluorescent molecules are excited to emit fluorescent light within the absorber layer, which then arrives by reflection at the interfaces within the material, preferably at the lateral marginal zones of the absorber layer, where appropriate optical detectors are provided for conversion into electrical signals.

Optical rotary transmitters in particular benefit from the aforescribed mechanism, which serve to transfer optical signals between a rotating element and an element remaining stationary in relation to the aforementioned element. An optical emitter means, e.g. a LED, which is moved along the path of a fibre optical waveguide, moves along the fibre optical waveguide which remains stationary, and which is preferably bent to form a closed circle and into which fluorescent molecules are embedded. On account of the lateral radiation into the fibre optical waveguide fluorescent light is produced within the fibre, which is equally guided via internal reflections to the ends of the fibre optical waveguide, where respective optical detector means are provided. With that known device it is possible to

transfer optical signals between a rotating element and an element remaining stationary relative to the first element.

With the fluorescent light being produced by spontaneous emission, which is induced in the fibre optical waveguide, the bandwidth of the optical signals to be transmitted is limited by the fluorescent life of the dyes in the fibre. If, however, there is the intention to receive optical signals at a maximum bandwidth possible without any loss of information there are limitations in the form of the known fluorescent dyes.

### **Brief description of the invention**

The invention is based on the problem of improving a device for receiving optical signals, which comprises a light-guiding object into which the optical signal to be received may be coupled which is converted by means of a detector unit into electrical signals suitable for further processing, in a way that firstly the light transmission from the optical signals coupled into the light-guiding object to the detector means will take place along a path as direct as possible, without occurrence of a noticeable signal attenuation. In particular, it should be possible to permit the reception of optical signals within a maximum bandwidth possible, largely without loss. The optical signals should be received over the largest area possible, with the costs incurred thereby being kept as low as possible. The receiver should be suitable in particular for application in optical rotary transmitters.

The solution to the problem underlying the invention is defined in Claim 1. Features improving the inventive idea in an expedient manner are the subject matters of Claims 1 to 5. The Claims 6 et seq. relate to an inventive use of the device for the optical signal transmission between two elements mobile relative to each other.

The invention starts out from the idea that the light-guiding object, which is provided for the reception of optical signals, is provided with a material having an electron array which can be inverted by energetic excitation and which, by way of

stimulated emission, emits light at an emission wavelength which corresponds to the wavelength of the optical signals to be received. The inversion of the electron array is stimulated by an excitation unit, preferably by an optical pumped light source. A detector means is optically coupled to the light-guiding object for detection of the light which can be produced by the emission processes stimulated by the optical signals coupled into the light-guiding object. In accordance with the invention, the light-guiding object is made of a material, which is preferably synthetic and in which in response to light radiation at an angle between  $0^\circ$  and  $90^\circ$  relative to the irradiation surface a diffused light is produced within the material by elastic dispersion, with the wavelength of the diffused light corresponding to that of the irradiated light. What is essential is the aspect that the diffused light presents radiation components in the direction of a main propagation sense of the light-guiding object. This is to say that the light incident on the light-guiding object can be produced by dispersion processes of a radiation component within the light-guiding object, which is oriented in the direction in which the detector means is disposed. It is this radiation component, presenting the same wavelength as the optically incident signal, which is amplified by stimulated emission processes by the material present in the object and displaying a population inversion. The radiation generated during the amplification process presents not only the same wavelength as the generating radiation but also the same orientation, the same position in phase and the same polarisation. With the light amplification process taking place in response to stimulation, rather than spontaneously, and being stimulated directly by the light dispersed within the light-guiding object, the bandwidth is higher by several orders. It is possible in this manner to transmit the optical signals over the receiver means having an inventive configuration in a largely undistorted and amplified form to the detector means.

An essential aspect of the idea supporting the invention is the elastic dispersion of the incident light within the light-guiding object, which causes a deviation of diffused light also in a direction inside the material in which the detector means are disposed. In accordance with the invention it has been found that the share of



elastically diffused light occurs in transparent synthetic materials in a particular strong form.

One specific potential application of the receiver device having the inventive configuration for the reception of optical signals is the field of optical rotary transmitters.

The afore-described light-guiding object designed in accordance with the invention is configured as a fibre optical waveguide along which an emitter means is guided. The fibre optical waveguide may, for instance, have the shape of a circle along which an emitter means is displaced which is arranged on an element rotating relative to the fibre optical waveguide.

The material introduced into the fibre optical waveguide, wherein the electron population can be inverted, is optically excited, preferably by means of pumped lasers arranged at the ends of the fibres of the fibre optical waveguides, and changed over into an inverted population state in this manner.

The optical signals, which originate from the optical emitter means, are laterally radiated into the fibre optical waveguide which is made of synthetic material in which the light undergoes an elastic dispersion, with the original wavelength being retained. What is essential in this respect is the fact that radiation components are dispersed also in the axial direction of the fibre optical waveguide. This elastically diffused light is now amplified by induced emission over the entire periphery of the circle, so that amplified diffused light is emitted at the ends of the fibre optical waveguides, which has the same wavelength as the coupled-in optical signals. As the amplification is a process of induced emission there is no longer a limitation of the bandwidth, as this would be usual, on account of the restricted fluorescence life, in the known case operating on fluorescent dyes, so that the fibre optical waveguide ring designed in accordance with the invention presents a velocity higher by several orders, which means that optical signals with a high modulation

frequency, too, can be received and appropriately evaluated without loss of information.

For the detection of the signal light applied at the ends of the fibre optical waveguides in an amplified form coupler elements are provided which are selective by wavelength and which ensure the optical decoupling of the pumped light from the joining detector means, which pumped light is required for the stimulation process, is produced by the pumped lasers, and has a wavelength different from the wavelength of the optical signals to be processed.

Apart from the specific application of the inventive device for the reception of optical signals for the field of optical rotary transmission, however, any number of further applications is conceivable. It is possible, for instance, to use the receiver system as position-sensitive and/or orientation-sensitive detector by measuring the signal transit times between the light coupling site and the detector units disposed on both ends of the fibre optical waveguide. The measurement of the signal amplitudes of the light waves propagating within the fibre optical waveguide serves the aforementioned potential detection applications, too, in addition to the measurement of the signal transit times.

#### **Brief description of an embodiment**

One embodiment of the inventive device, which is particularly well suitable for receiving optical signals for the application of optical rotary transmitters, is illustrated in the attached figure.

The fibre optical waveguide, which is schematically indicated by the reference numeral 1 in the figure and which is made of a synthetic material, is shaped so as to form a ring and corresponds to the receiving means for the light of an optical emitter unit moving opposite to the fibre optical waveguide, which emitter unit is not illustrated in the figure. It is assumed that the emitter means couples an optical light signal into the fibre optical waveguide 1 at the site P, which light is then deviated by the aforescribed elastic dispersion in both directions relative to the fibre axis. In the illustrated embodiment, the materials contained in the fibre optical

waveguide 1 and presenting an inverted population are stimulated by optical excitation sources, e.g. a pumped laser PL, so that they contribute to the stimulated light amplification of the optical output signals which are deviated in the axial direction. Couplers WDM selective by wavelengths are provided for separating the signal light, which emerges at the ends of the fibre optical waveguides, from the pumped laser light.

The optical signals received in this manner may present bandwidths in the GHz range.

### Patent Claims

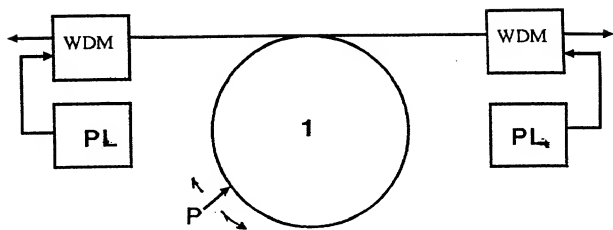
1. Device for receiving optical signals, comprising a light-guiding object into which the optical signal to be received may be coupled and which contains material having an electron array which may be inverted by energetic excitation and which, in response to stimulated emission, emits light at an emission wavelength which corresponds to the wavelength of the optical signals to be received,  
and comprising an excitation unit inducing the inversion, as well as a detector means optically coupled to said light-guiding object for the detection of the light which can be produced by emission processes stimulated by the optical signals coupled into said light-guiding object,  
**characterised** in that said light-guiding object consists of a material, preferably a synthetic material, which, in response to light radiation at an angle of  $0^\circ < \alpha \leq 90^\circ$  relative to the irradiation surface, produces light within the material by elastic dispersion – which means that the wavelength of the diffused light corresponds to the wavelength of the irradiated light – which has a radiation component in the direction of a main propagation sense of said light-guiding object.
2. Device according to Claim 1,  
**characterised** in that said light-guiding object is a fibre optical waveguide in which one share of said elastically diffused light propagates along the fibre axis.
3. Device according to Claim 1 or 2,  
**characterised** in that said excitation unit is an optical pumped light source.

4. Device according to any of the Claims 2 to 3,  
**characterised** in that an optical pumped light source and/or an element selective by wavelength is provided on at least one end of said fibre optical waveguide, which element filters the pumped light from the optical signals.
5. Application of the device according to the Claims 1 to 4 for optical signal transmission between two parts mobile relative to each other such that the optical signals emitted by an emitter unit are coupled into said light-guiding object.
6. Application according to Claim 5,  
**characterised** in that said light-guiding object is disposed on a stationary element and said optical emitter means, which emits said optical signals, is arranged on a rotating element such that during one full turn of said rotating element the emitted optical signals may permanently be coupled into said light-guiding object.
7. Application of the device according to the Claims 1 to 4 as position-sensitive detector for light radiation by evaluation of signal transit times and/or signal amplitudes.
8. Application of the device according to the Claims 1 to 4 as orientation-sensitive detector for light radiation by evaluation of signal transit times and/or signal amplitudes.

### **Abstract of the Disclosure**

What is described here is a device for receiving optical signals, comprising a light-guiding object into which the optical signal to be received may be coupled. The light-guiding object contains a material having an electron array adapted to be inverted by energetic excitation, which, in response to stimulated emission, emits light at an emission wavelength which corresponds to the wavelength of the optical signals to be received. An excitation unit is provided for inversion of the material. Moreover, a detector means is optically coupled to the light-guiding object for detecting the light which can be produced by the emission processes stimulated by the optical signals coupled into the light-guiding object.

The invention is characterised by the aspect that the light-guiding object consists of a material, preferably a synthetic material, which, in response to light radiation at an angle of  $0^\circ < \alpha \leq 90^\circ$  relative to the irradiation surface within the material, produces light by elastic dispersion – which means that the wavelength of the diffracted light corresponds to the wavelength of the irradiated light – which has a radiation component in the direction of a main propagation sense of the light-guiding object.



**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY**  
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NO.

1384.1006/JDH

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DEVICE FOR THE RECEPTION OF VISUAL SIGNALS USING LIGHT-CONDUCTING OBJECTS

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. \_\_\_\_\_

on \_\_\_\_\_

and was amended

on \_\_\_\_\_ (if applicable).

☒ was filed as PCT international application

Number \_\_\_\_\_

on November 23, 1998

and was amended under PCT Article 19

on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

**PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:**

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
DE	196 25 870.7-51	27-06-96	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO



**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Continued)**  
(includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NO.  
1384.1006/JDH

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS

STATUS (Check one)

U.S. APPLICATION NUMBER

U.S. FILING DATE

PATENTED

PENDING

ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.

PCT FILING DATE

U.S. SERIAL NUMBERS  
ASSIGNED (if any)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the U.S. Patent and Trademark Office connected therewith. (List name and registration number.) James D. Halsey, Jr., 22,729; Harry John Staas, 22,010; David M. Pitcher, 25,908; John C. Garvey, 28,607; J. Randall Beckers, 30,358; William F. Herbert, 31,024; Richard A. Golthofer, 31,106; Mark J. Henry, 34,162; Gene M. Garner II, 34,172; Michael D. Stein, 37,240; Paul I. Kravetz, 35,230; Gerald P. Joyce, III, 37,648; Todd E. Marlette, 35,269; Harlan B. Williams, Jr., 34,754; George N. Stevens, 36,938; Michael C. Solder, 41,455; Norman L. Ourada, 41,235; Kevin R. Spivak, 43,148 and William M. Schertler, 35,348 (agent)

201	FULL NAME OF INVENTOR	FAMILY NAME <u>POISEL</u>	FIRST GIVEN NAME <u>Hans</u>	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY <u>Leinburg</u>	STATE OR FOREIGN COUNTRY <u>Germany</u>	COUNTRY OF CITIZENSHIP <u>Germany</u>
	POST OFFICE ADDRESS	POST OFFICE ADDRESS <u>Puhlhof 14, D-91227</u>	CITY <u>Leinburg</u>	STATE & ZIP CODE/COUNTRY <u>Germany</u>
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201 <u>Hans Poisel</u>	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE <u>26-4-99</u>	DATE	DATE